

Remarks:

Reconsideration of the application is requested. Claims 14-31 are now in the application. Claims 14-26 have been amended. Claims 27-31 have been added.

In item 1 of the Office action, the Examiner objected to the Abstract for containing legal phrasology. In particular, the Examiner objected to the phrases, "Disclosed is a ..." and "Means". The Abstract has been amended to remove these terms and to make it more readable.

In item 2 of the Office action, the Examiner objected to the disclosure for containing a typographical error. The specification has been amended and the error corrected by changing the word "degree" to "--degrees--" as suggested.

In item 3 of the Office action, the Examiner objected to claims 14, 23, and 24 for containing informalities and for including a claim dependency to a canceled claim. The claims have been amended to remove the errors.

In item 4 of the above-identified Office action, the Examiner has rejected claims 25-26 as being indefinite under 35 U.S.C. § 112, second paragraph. More specifically, the Examiner rejected claim 25 as being in narrative form. Claim 25 has been amended to state positively method steps. Likewise, claim 26 has been amended to include positively-stated method steps.

Accordingly, the specification and the claims meet the requirements of 35 U.S.C. § 112, first and second paragraphs. Should the Examiner find any further objectionable items, counsel would appreciate a telephone call during which the matter may be resolved. The changes are neither provided for overcoming the prior art nor do they narrow the scope of the claim for any reason related to the statutory requirements for a patent.

In item 8 of the Office action, the Examiner rejected claims 14-20, 22-23, and 25 as being obvious over JP 8-39214 in view of JP 2002-239690 under 35 U.S.C. § 103(a). The rejection has been noted and the claims have been amended in an effort to define more clearly the invention of the instant application. Support for the changes is found on page 5, third full paragraph, of the specification. *See also* Figs. 1-3 showing at least a portion of the tubular-shaped refractory layer 3 upstream the swirl vane 4.

Before discussing the prior art in detail, a brief review of the invention as claimed is provided. Amended claim 14 calls for an immersion nozzle for continuous casting of steel. The nozzle includes, *inter alia*, the following:

a wall surface defining an inner hole to allow molten steel to flow through said inner hole;

a swirl vane disposed in said inner hole for generating a swirling flow in the molten steel passing by said swirl vane;

a refractory layer containing CaO and MgO forming at least a part of said wall surface upstream of said swirl vane, said refractory layer being prepared by controlling a weight ratio of each of CaO and MgO in said refractory layer and an apparent porosity. (Emphasis added by Applicant.)

JP 08-39214 merely shows a refractory layer containing CaO and MgO lining a wall surface of an immersion nozzle.

JP 2002-239690 merely shows a swirl vane in an immersion nozzle.

The specification of the instant application recognizes that, after a swirl vane, Al₂O₃-based inclusions and bubbles are concentrated in the center of molten steel flow (i.e. away from the inner wall); *see* p. 2, first full paragraph.

The inventors recognized to place a refractory surface downstream the swirl vane, along the inner wall, would minimize the reactions between the Al₂O₃-based inclusions and the material of the refractory material.

Accordingly, the inventors placed at least a portion of the refractory surface upstream the swirl vane. This allows the Al₂O₃-based inclusions to react with the material of the refractory material and to be subsequently swirled to the center of the nozzle away from the inner wall.

JP 09-039214 in light of JP 2002-239690 provides no suggestion of having at least a portion of the refractory surface upstream the swirl vane. Accordingly, amended claim 14 would not be obvious to one with ordinary skill in the art.

Accordingly, none of the references, whether taken alone or in any combination, either show or suggest the features of claim 14. Therefore, claim 14 is patentable over the art.

Moreover, because all of the dependent claims are ultimately dependent on claim 14, they are believed to be patentable as well.

In view of the foregoing, reconsideration and allowance of claims 14-31 are solicited. In the event the Examiner should still find any of the claims to be unpatentable, please telephone counsel so that patentable language can be substituted.

If an extension of time for this paper is required, petition for extension is herewith made.

No fee is believed due. However, please charge any required fee (or credit any overpayments of fees) to the Deposit Account of the undersigned, Account No. 500601 (Docket No. 7620-X06-005).

Respectfully submitted,

A handwritten signature in dark ink, appearing to read 'P. Bianco', with a large, sweeping initial 'P'.

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